Cumulative

View 13 Wood Green Common – north corner, adjacent to playground

24mm – 36.9° *35mm – 27.2°* *50mm – 19.8°* *Image scaling factor = 46% at A3, 130% at A0* *50mm – 19.8°* *35mm – 27.2°* *24mm – 36.9°*

View 17

Hillfield Avenue, to the north of junction with Harold Road

Future Baseline with Consented Maximum Parameter

Proposed Development

Future Baseline with Consented Maximum Parameter

This view looks from Hillfield Avenue to the north of the junction with Harold Road, north-east down towards the Site. The elevated viewing position is within the Hillfield Avenue Conservation Area. The foreground of the view shows the regular rhythm of the 19th century terraces on Hillfield Avenue; the area in view is representative of the character of the wider conservation area which extends to the north and along Harold Road to the east. Although within an area largely defined by residential development, there are some areas of modern infill in the distant centre of the view on the horizon, most notably the completed buildings in Phases 1 and 2 of the Clarendon Gas Works Masterplan, which occupy the right hand side of the more distant vista. Part of Phase 3 under construction is visible in pink wireline beyond them. The Consented Maximum Parameter occupies the centre of the view, with Zones F and G-J in the foreground and Zone H allowing for a taller landmark building on the skyline beyond them. The view has a **high** sensitivity to change.

Proposed Development

The Proposed Development would be visible terminating the long, channelled vista through the conservation area in the foreground, seen beyond Phases 1, 2 and 3 of the Clarendon Gas Works Masterplan in the middle ground. Plot H1 of the Proposed Development would be just over 1km from the viewing position and its taller scale and lighter materiality would create a legible landmark on the skyline. Plots H1 and H2 with their lower height and complementary brick materiality would appear embedded in the emerging masterplan. The Proposed Development would intensify development already apparent in the view, stepping up in height to create an attractive cluster with a slender point of landmark punctuation on the skyline. The Proposed Development would contribute to the urban layering of Wood Green seen beyond the conservation area and visually connect Wood Green into the existing Hornsey townscape contributing to legibility and wayfinding. The Proposed Development would comply with the Consented Maximum Parameter; its effect on the view would remain as assessed in the October 2017 THVIA.

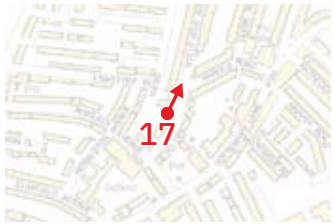
Significance of Effect: minor, beneficial.

Cumulative

The Consented Maximum Parameter for Zones F and G-J would be seen to the left of the Proposed Development. This is the Consented Maximum Parameter envelope and not a proposed building at this stage, the detailed design of this zone is yet to be carried out. The tallest element of the Chocolate Factory development would be seen to the left of the Clarendon Gasworks Masterplan but would not be an immediately noticeable element of the view appearing at a similar height to the completed buildings of the Clarendon Gas Works. The layering effect of the townscape as a result of emerging schemes in Wood Green would be furthered by the Caxton Square buildings which emerge at a lower scale to the left of the tallest element of the Chocolate Factory development. The cumulative effect on the view would remain as assessed in the October 2017 THVIA.

Significance of Effect: minor, beneficial.

View location



Camera position

Cumulative

View 17 Hillfield Avenue, to the north of junction with Harold Road

24mm – 36.9° *35mm – 27.2°* *50mm – 19.8°* *Image scaling factor = 46% at A3, 130% at A0* *50mm – 19.8°* *35mm – 27.2°* *24mm – 36.9°*

View 19
Alexandra Palace – road down to Wood Green

Future Baseline with Consented Maximum Parameter

Proposed Development

Future Baseline with Consented Maximum Parameter

This view is taken from close to the mini roundabout on South Terrace, to the north-east of Alexandra Palace. The viewing position is within the Alexandra Palace and Park Conservation Area and the Alexandra Palace Grade II Registered Park and Garden, looking south-east towards the Site. The foreground of the view shows the fence to the south of South Terrace with the Alexandra Park landscape beyond. The trees within the park and around its periphery screen views of its immediate setting, which includes a variety of residential and industrial buildings to the south-west. From this elevated perspective, there are distant views towards Wood Green, Noel Park and east London beyond; the light-coloured roofs at the centre of the view are the industrial buildings and large residential blocks clustered around the railway line. The red brick building seen to the left is The Mall Wood Green. The mid-rise brisk buildings of completed Phases 1 of the Clarendon Gasworks Masterplan are visible to the right of centre beyond industrial sheds. As the image demonstrates, substantial modern buildings make a significant contribution to the park's existing setting in this location. The Consented Maximum Parameter in blue wireline occupies the centre of the view with the taller Zone H to the left and mid-rise Zones G-J and F to its right linking Zone H to the completed Phase 1. The view has a **high** sensitivity to change.

Proposed Development

The Proposed Development would intensify development already apparent in the view making a noticeable change to the composition of the existing townscape. The Proposed Development would provide a visual link between Alexandra Park and Wood Green, marking the regeneration of Wood Green. The tallest element, Plot H1, would create a new slender focal point with a legible crown seen rising above the scale of the existing townscape on the skyline. The lower Plot H2 to its left would sit below the skyline and, thanks also to its brick materiality, would appear more embedded in the emerging townscape of the Clarendon Gasworks development – and clearly distinct from Plot H1. The Proposed Development would create a well composed cluster with individual buildings of different heights and architectural treatment contributing layering and visual richness to the unremarkable wider setting of the park. The Proposed Development would comply with the Consented Maximum Parameter; its effect on the view would remain as assessed in the October 2017 THVIA.

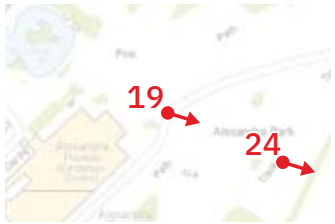
Significance of Effect: moderate, beneficial.

Cumulative

The Consented Maximum Parameter for Zones F and G-J would be seen to the right of the Proposed Development. This is the Consented Maximum Parameter envelope and not a proposed building at this stage, the detailed design of this zone is yet to be carried out. The Chocolate Factory development, seen to the left of the Proposed Development in green wireline, would relate well in scale and massing to the Proposed Development consolidating the taller townscape of Wood Green in the middle ground but not increasing the scale of the effect. The lower scale cumulative schemes at Mayes Road and Brook Road would add further layers to the townscape seen beyond the Chocolate Factory development and to the left of Zone H in this view. These would help to further integrate the redeveloped Clarendon Gas Works Site with the local townscape at Wood Green. The cumulative effect on the view would remain as assessed in the October 2017 THVIA.

Significance of Effect: moderate, beneficial.

View location



Camera position

Cumulative **View 19** Alexandra Palace – road down to Wood Green

24mm – 36.9° *35mm – 27.2°* *50mm – 19.8°* *Image scaling factor = 46% at A3, 130% at A0* *50mm – 19.8°* *35mm – 27.2°* *24mm – 36.9°*

View 24
Alexandra Palace, mid-level footpath

Future Baseline with Consented Maximum Parameter

Proposed Development

Future Baseline with Consented Maximum Parameter

This viewing position is to the east of Alexandra Palace, at the footpath junction, looking east towards the Site. This view is taken mid-way between the high point of the Alexandra Palace terrace and the low point of the playing fields. The viewing position is within the Alexandra Palace and Park Conservation Area and the Alexandra Palace Grade II Registered Park and Garden. The foreground of the view shows a small open space to the north of the footpath which bisects the park. In winter, a number of taller modern buildings are visible within and above the treeline, including The Mall Wood Green to the left, and industrial buildings clustered around the railway line and the completed Phase 1 of the Clarendon Gasworks Masterplan to the right. The 2021 Consented Maximum Parameter in blue wireline is visible beyond the treeline on the edge of the park. As for the maximum parameter envelope assessed in the October 2017 THVIA, Zone H rises above the treeline seen from this position. The view has a **high** sensitivity to change.

Proposed Development

The tops of the Proposed Development would be visible through and above the trees. In summer only Plot H1 block would be visible as only this part of the Proposed Development would rise above the tree line – more slender in form than the Consented Maximum Parameter envelope for Zone H. Plots H2 and H3 in brick, would be visible through the winter trees lower in scale to either side of Plot H1 but would be obscured from this position by the foreground park foliage in summer. The composition of the three buildings with varying heights would create an attractive cluster form. Plot H1 would contribute a slender new focal point to the view marking Wood Green beyond the park, seen in the context of the emerging Clarendon Gasworks Masterplan visible through the winter trees. The Proposed Development would comply with the Consented Maximum Parameter; its effect on the view would remain as assessed in the October 2017 THVIA.

Significance of Effect: minor, beneficial.

Cumulative

The Consented Maximum Parameter for Zones F and G-J would be seen to the right of the Proposed Development. This is the Consented Maximum Parameter envelope and not a proposed building at this stage, the detailed design of this zone is yet to be carried out. The Chocolate Factory development, seen to the left of the Proposed Development in green wireline, would relate well in scale and massing to the Proposed Development consolidating the taller townscape of Wood Green in the middle ground but not rising above the treeline and not visible in summer. The Caxton Square development to the far left of the group of cumulative schemes would only be very minimally visible, its lower scale more obscured by the dense tree coverage even in winter conditions. Likewise, the Brook Road buildings would be seen within the roofscapes of the similarly lower scale Chocolate Factory buildings to the left of the Proposed Development at Plots H1, 2 and 3. The cumulative effect on the view would remain as assessed in the October 2017 THVIA.

Significance of Effect: minor, beneficial.

View location

Camera position

Cumulative **View 24** Alexandra Palace, mid-level footpath

24mm – 36.9° *35mm – 27.2°* *50mm – 19.8°* *Image scaling factor = 46% at A3, 130% at A0* *50mm – 19.8°* *35mm – 27.2°* *24mm – 36.9°*

View 27
Reservoir

Future Baseline with Consented Maximum Parameter

Proposed Development

Future Baseline with Consented Maximum Parameter

This view is taken from the eastern edge of Alexandra Park, looking east across the Hornsey Water Works reservoir towards the railway and the Site. The viewing position is within the Alexandra Palace and Park Conservation Area and the Alexandra Palace Grade II Registered Park and Garden but looks over the Hornsey Water Works Conservation Area. The eastern boundary railings of Alexandra Park are visible in the foreground, and the middle of the view is occupied by the open water of the reservoir. Industrial buildings associated with the Water Works, curved roofed sheds, are visible on the east side of the reservoir in the mid-distance to the right with the completed buildings in Phase 1 of the Clarendon Gasworks Masterplan seen beyond. The railway embankment, railway infrastructure and railway sheds form the backdrop to the view to the left. The Penstock pedestrian tunnel under the railway is in this location, but it cannot be seen from this viewpoint. The Consented Maximum Parameter of the Proposed Development in blue wireline will provide a new, prominent group of buildings in this view, on the eastern side of the reservoir seen in relation to the emerging completed development on the Clarendon Gasworks site. Zone H is the taller part of the Consented Maximum Parameter to the left with the medium rise Zone G-J in its foreground and Zone F to the right adjacent to the completed Phase 1. The Phase 3 buildings under construction in Zones D and E, shown in pink wireline, are concealed behind them. The view has a **high** sensitivity to change.

Proposed Development

The Proposed Development intensifies the Clarendon Gas Works development already apparent in the view. The tallest element of the Proposed Development, Plot H1 would form the landmark focal point for the Masterplan Site with and lower 'shoulder' buildings of H2 and H3 seen to either side creating a well-articulated cluster. The lower scale and warm muted tones of the brick to Plots H2 and H3 would embed them within the emerging townscape of the Clarendon Gasworks Masterplan. The contrasting paler materiality with its strongly articulated crown of Plot H1 would be clearly distinguished from the lower buildings as the primary landmark for the development. The shoulder of H1 seen from this position, adding interest to the articulation of the tallest building and indicates the location of the new public square within the Proposed Development. The Proposed Development would provide a marker for the pedestrian route under the railway and would visually link Alexandra Park to Wood Green. The Proposed Development would comply with the Consented Maximum Parameter; its effect on the view would remain as assessed in the October 2017 THVIA.

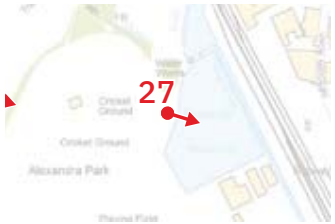
Significance of Effect: moderate, beneficial.

Cumulative

The Consented Maximum Parameter for Zones F and G-J would be seen to the right of the Proposed Development. This is the Consented Maximum Parameter envelope and not a proposed building at this stage, the detailed design of this zone is yet to be carried out. The Chocolate Factory development, seen to the left of the Proposed Development in green wireline, would relate well in scale and massing to the Proposed Development consolidating the taller townscape of Wood Green in the middle ground of the view and increasing the scale of effect on the view. In combination, the buildings will provide an attractive new skyline in the backdrop of the Water Works and the railway. The cumulative effect on the view would remain as assessed in the October 2017 THVIA.

Significance of Effect: major, beneficial.

View location



Camera position

Cumulative **View 27** Reservoir

24mm – 36.9° *35mm – 27.2°* *50mm – 19.8°* *Image scaling factor = 46% at A3, 130% at A0* *50mm – 19.8°* *35mm – 27.2°* *24mm – 36.9°*

4 Summary and Conclusions

4.1 This Reserved Matters Application (RMA) is for Phase 4 of the Clarendon Gas Works Masterplan, comprising of Plots H1, H2 and H3. This report has assessed the impact of the detailed designs for the Proposed Development in Zone H of the Masterplan on heritage, townscape and visual amenity.

4.2 The Site is allocated in the emerging AAP (Ref. 1-7) and is identified as suitable for the development of tall buildings.

4.3 The Proposed Development would comply with the Consented Maximum Parameter.

4.4 Both the quantitative and qualitative aspects of the detailed application have been tested in this report. The Proposed Development is a well-considered, high quality residential development which will create its own distinct character whilst also providing a complimentary addition to the northern end of the wider masterplan site. The Proposed Development would introduce new landmark buildings at Wood Green that would mark the entrance to the regenerated Gas Works from Coburg Road and the location of the new public square.

4.5 The Consented Maximum Parameter for Zone H has increased in height since the assessment made in the October 2017 THVIA. As demonstrated by the remodelled views, which have also informed the built heritage and townscape assessments, the Proposed Development would comply with the Consented Maximum Parameter. In View 10, the increase in the scale of middle ground trees since 2017 would screen the Proposed Development to a greater extent and this has resulted in a reduction in the scale of the effect of the Proposed Development on the view. Although the Consented Maximum Parameter has slightly increased in scale and allows for the Proposed Development to be taller than was envisaged in the October 2017 THVIA, in all other views the effects of the Proposed Development would remain unchanged in comparison to those assessed in the October 2017 THVIA.

5 References

1-1 Ministry of Housing, Communities & Local Government, *National Planning Policy Framework* (NPPF) (July 2021)

1-2 DCLG, *National Planning Practice Guidance* (NPPG) (March 2014; thereafter revised)

1-3 Ministry of Housing, Communities & Local Government, *National Design Guide* (2021)

1-4 Historic England, *Historic England Advice Note 4: Tall Buildings* (March 2022)

1-5 GLA, *The London Plan: Spatial Development Strategy for Greater London* (March 2021)

1-6 GLA, *London View Management Framework Supplementary Planning Guidance* (LVMF SPG) (July 2012)

1-7 London Borough of Haringey, *Wood Green Area Action Plan* (Preferred Option Consultation Draft, February 2017)

1-8 London Borough of Haringey, *Haringey's Local Plan, Strategic Policies* (July 2017)

1-9 London Borough of Haringey, *Urban Character Study* (February 2015)

1-10 Planning (Listed Buildings and Conservation Areas) Act 1990 (as amended)

Appendix A Supplementary Unverified Views

Table A-1: Appendix Views metadata

View	Location	Page	Style	Render / Wireline	Verified	Ref	OS-E	OS-N	Height (AOD)	Heading	Lens	Field of View	Film	Date	Time
8	Adams Road (The Willow on Broadwaters School)	35	AVR1	Wireline	No	D14027	532796.5	190243.469	17.615	–	50mm	40	Digital	30/11/16	09:19
9	Bruce Castle at Lordship Lane	38	AVR1	Wireline	No	D14992	533353.5	190590.935	19.854	–	24mm	74	Digital	21/04/17	11:14

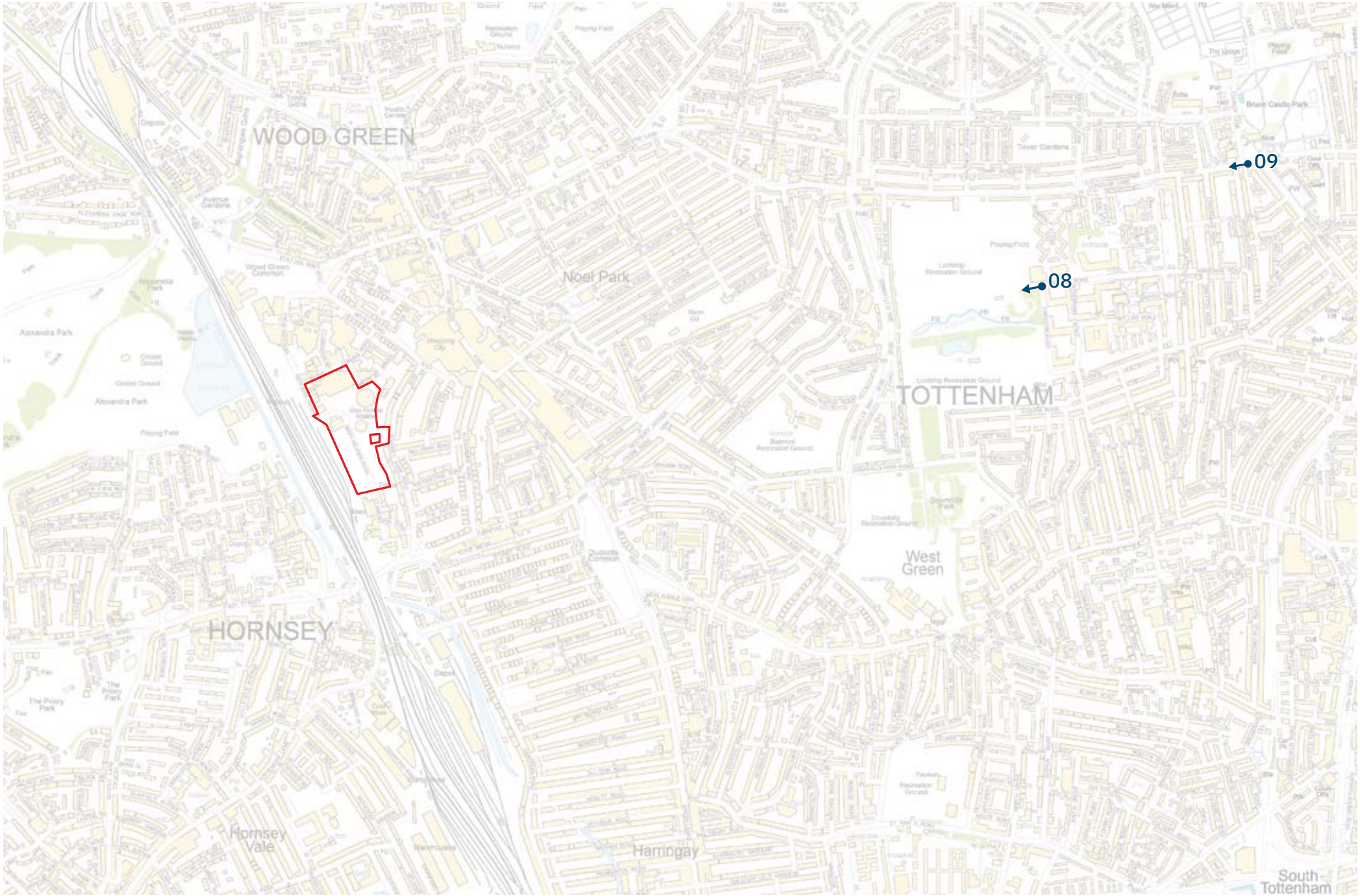
View 08 Adams Road (The Willow on Broadwaters School)

Page 35

View 09 Bruce Castle at Lordship Lane

Page 38

Map of appendix views for assessment



View 08

Adams Road (The Willow on Broadwaters School)

Existing view – October 2017 THVIA

View location

Camera position

View 08

Adams Road (The Willow on Broadwaters School)

Proposed view – October 2017 THVIA

View 08

Adams Road (The Willow on Broadwaters School)

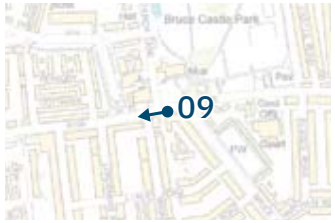
Cumulative view – October 2017 THVIA

View 09

Bruce Castle at Lordship Lane

Existing view – October 2017 THVIA

View location



Camera position

View 09

Bruce Castle at Lordship Lane

Proposed view – October 2017 THVIA

View 09

Bruce Castle at Lordship Lane

Cumulative view – October 2017 THVIA

Appendix B Cityscape Digital Methodology

Table of views

View	Visualisation type	Level of accuracy of location	Render / wireline	Ref	OS-E	OS-N	Height (AOD)	Height (AGL)	Heading	Lens	Lens choice	Field of view	Date	Time
4	Type 4	Better than 0.05m	Render + Wireline	D26997	530876.7177	190132.4901	22.13 M	1.60 M	214°	24mm	Inclusion of relevant context	74°	21/01/23	09:32
7	Type 4	Better than 0.05m	Render + Wireline	D26974	532437.5	189723.1734	24.83 M	1.60 M	274°	50mm	Standard lens for open spaces	40°	17/01/23	13:47
10	Type 4	Better than 0.05m	Render + Wireline	D26977	534561.521	190023.685	17.52 M	1.60 M	268°	50mm	Standard lens for open spaces	40°	12/01/23	15:28
13	Type 4	Better than 0.05m	Render + Wireline	D26978	530526.251	190331.118	28.94 M	1.60 M	152°	24mm	Inclusion of relevant context	74°	15/01/23	09:41
17	Type 4	Better than 0.05m	Render + Wireline	D26979	530483.976	189018.812	47.30 M	1.60 M	20°	24mm	Inclusion of relevant context	74°	17/01/23	13:13
19	Type 4	Better than 0.05m	Render + Wireline	D26980	529793.136	190155.885	85.09 M	1.60 M	101°	24mm	Inclusion of relevant context	74°	17/01/23	14:30
24	Type 4	Better than 0.05m	Render + Wireline	D26981	529968.068	190090.25	55.93 M	1.60 M	94°	24mm	Inclusion of relevant context	74°	15/01/23	11:16
27	Type 4	Better than 0.05m	Render + Wireline	D26982	530321.876	189991.096	31.62 M	1.60 M	109°	24mm	Inclusion of relevant context	74°	15/01/23	12:30
8	Type 4	Better than 0.05m	Render + Wireline	D26975	532796.5	190243.4693	16.02 M	1.60 M	–	50mm	Standard lens for open spaces	40°	12/01/23	14:27
9	Type 4	Better than 0.05m	Render + Wireline	D26976	533353.5	190590.9347	18.25 M	1.60 M	–	24mm	Inclusion of relevant context	74°	12/01/23	16:10

0.0 Introduction

0.1 Methodology overview

The methodology applied by Cityscape Digital Limited to produce the *'Type 4 Photomontages survey / scale verifiable'*[1] or views contained in this document are described below. In the drafting of this methodology and the production and presentation of the images, guidance has been taken from the 'TGN 06/19 Visual Representation of development proposals' (TGN06/19) from the Landscape Institute published on 17 September 2019 in support of GLVIA3.

The disciplines employed are of the highest possible levels of accuracy and photo-realism which are achievable with today's standards of architectural photography and computer-generated models.

0.2 View selection

The viewpoints are being selected through a process of consultation with relevant statutory consultees by townscape/heritage consultants and having regard to relevant planning policy and guidance.

1.0 Photography

1.1 Digital photography

High quality digital full frame sensor cameras are being utilised.

1.2 Lenses

In accordance with TGN 06/19, Cityscape balances the need to include the extent of the site and sufficient context with the stated preference for 50mm lenses. For local urban views a wide angle lens of 24mm or 35mm is generally used. For more open spaces the default is 50mm, intermediate distance views are photographed with a lens between 35mm to 70mm and occasionally long range views may be required with lens options ranging from 70mm to 1200mm.

As a guide, the following approach is used:

View	Lens options
Relevant foreground, urban context or large site	24mm – 35mm
Open spaces, where proposed development can be included	50mm
800 to 5000 metres – intermediate	35mm – 70mm
5000+ metres – long	70mm – 1200mm

Examples of these views are shown in Figures 1 and 2.

1.3 TGN 06/19

States that:

"2.2 Baseline photography should: [...] include the extent of the site and sufficient context;"[2]

"1.1.7 If a 50mm FL lens cannot capture the view in landscape or portrait orientation (for example, if the highest point of the development is approaching 18° above horizontal) the use of wider-angled prime lenses should be considered, working through the following sequence of fixed lenses in this order: 35mm FL > 28mm FL > 24mm FL > 24mm FL Tilt-Shift. Tilt-Shift Lenses are considered at Appendix 13. In these unusual situations, the reasoning for the choice and the approach used should be documented, and the agreement of the competent authority should be sought (see Appendix 10 Technical Methodology)."[3] and

"Views should include the full context of the site / development and show the effect it has upon the receptor location.[...]"[4]

1.4 Digital camera

Cityscape uses high quality professional DSLR (digital single lens reflex) and DSLM (digital single lens mirrorless) cameras. The cameras utilise FFS (full frame sensors) so declared focal lengths require no conversion to be understood in line with TGN 06/19 guidelines.

Cityscape use high quality lenses that are matched to the resolution of the cameras to ensure high contrast and sharp rendition of the images.

1.5 Position, time and date recording

The photographer is provided with (i) an Ordnance Survey map or equivalent indicating the position of each viewpoint from which the required photographs are to be taken, and (ii) a digital mockup rendered with a context model of the desired view. For each viewpoint the camera is positioned at a height of 1.60 metres above the ground level which closely approximates the human eye altitude, and falls into the 1.5-1.65m range provided by TGN 06/19[5].

If local conditions required a deviation to capture the view, the exact height can be found in the Table of Views. A point vertically beneath the entrance pupil of the lens is marked on the ground as a survey reference point and two digital reference photographs are taken of (i) the camera/tripod location and (ii) the survey reference point (as shown in Figures 3 and 4). The date and time of the photograph are recorded by the camera.

1 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp. 21-2

2 TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp. 5, Paragraph 2.2

3 TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp. 28, Paragraph 1.1.7

4 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp. 35, Paragraph 4.1.5

5 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp. 50

1.0 Photography (continued)

1: Local view

2: Intermediate view

3: Camera location

4: Survey reference point

2.0 Digital image correction

2.1 Raw file conversion

Professional digital cameras produce a raw file format, which is then processed for both high detail and colour accuracy. The final image is saved as an 8 bit tiff[6] file.

2.2 Digital image correction

The digital photographs were prepared for the next stage of camera matching (see Sections 6 and 7).

All lenses exhibit a degree of geometric distortion. The most common types are radially symmetrical along the principal axis of the lens, and tend to grow in size towards the perimeter of the image. The outer edges of the images are therefore not taken into consideration to reduce inaccuracies. Figure 5 illustrates the 'safe' or non-distortive area of an image which is marked by a red overlay.

The adjusted or corrected digital image, known as the 'background plate', is then saved ready for the camera matching process (see Sections 6 and 7). In preparation for the survey (see Section 3.2) Cityscape indicates on each background plate the safe area and priority survey points, such as corners of buildings, retained elements and party walls for survey (see Figure 6).

5: Area of interest to be surveyed

6: Background plate highlighting critical survey points in green and secondary survey strings in red

6 TIFF is the name given to a specific format of image file stored digitally on a computer.

3.0 Type 4 visualisations

3.1 Type 4 visualisation

Unless otherwise specified visualisations are completed to TGN 06/19[7] Type 4 Photomontage / Photowire (survey / scale verifiable) standards.

3.2 Survey

An independent surveyor is contracted to undertake the survey of (i) each viewpoint as marked on the ground beneath the entrance pupil of the lens at the time the photograph is taken (and recorded by way of digital photograph (see Section 1 above) and (ii) all the required points on buildings, hard landscape features or immobile permanent objects within the safe zone. The survey is coordinated onto the Ordnance Survey National Grid (OSGB36) by using GNSS (global navigation satellite system such as GPS[8]) equipment (see, for example, Figure 7) and processing software. The Ordnance Survey National Grid (OSGB36) is chosen as it is the most widely used and because it also allows the captured data to be incorporated into other available digital products (such as Ordnance Survey maps). The height datum used is Ordnance Survey Newlyn Datum and is also derived using the GNSS.

Improvements to the real-time position of GNSS data is achieved by RTK (real time kinematic) compensation, which utilises a comparison between known base stations positions and their current position fix to produce correction data to the measurements. The required points on each building are surveyed using conventional survey techniques utilising an electronic theodolite and reflectorless laser technology (shown in Figure 8). In certain circumstances, a viewpoint may need to be surveyed using conventional survey techniques as opposed to RTK, if, for example, the viewpoint is in a position where GNSS information cannot be received.

3.3 False origin

3D modelling programs, unlike CAD/BIM programs, have inherent inaccuracies the further an object is away from the origin. Cityscape decide on and record a local, 'false origin' that is used to move the model closer to the origin. This alleviates the inaccuracies. The 3D model of the proposed development, consented scheme models, and survey data are all moved uniformly to this new false origin. When performing positioning checks (see Section 5.2) the offset between false origin and OS are added back to the coordinates.

7: Field survey being carried out, GNSS receiver

8: Field survey being carried out, total station

7 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp.11, Table2, pp 21-24.

8 https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/land/guidelines-for-the-use-of-gnss-in-surveying-and-mapping-2nd-edition-rics.pdf

4.0 Type 3 visualisations

4.1 Type 3 visualisation

These visualisations are as described in TGN 06/19[9] Type 3 Photomontage / Photowire (not survey / scale verifiable) standards. In contrast to Type 4, Type 3 visualisations rely on good quality data for camera matching, but are not relying on surveys as described in Section 3.2. Data sources such as GPS, OS Maps, 3D City models, geo-referenced aerial photography, LiDAR or 3D models can be used.

The individual data source used is declared in an accompanying table. The possible angular shift of a 1m lateral displacement of the camera against its actual coordinate depends on the distance of the object from the camera[10]:

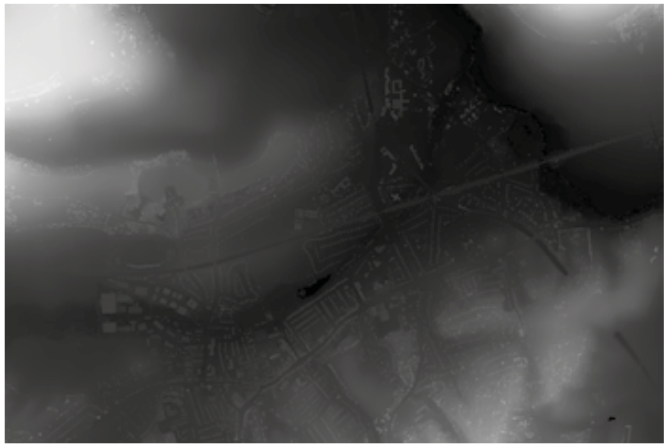
Distance from camera	Apparent shift
10m	5.7°
100m	0.57°
1,000m	0.057°
10,000m	0.006°

Cityscape also create 3D DSM (Digital Surface Model) models from publicly available data sources, such as Defra LiDAR scans from the Defra Data Services Platform. We always choose the newest data available at the highest possible resolution, typically at 1m resolution. The data is processed to coordinate onto Ordnance Survey National Grid (OSGB36), and converted to a Square Grid DSM. The square grid is then optimised into a TIN (Triangulated Irregular Network). The optimisation has been validated to produce no loss in usable information of the geometric mesh. This process follows the guidelines set out in 'Guidance – Visual representation of wind farms – Feb 2017'[11].

DSM source is typically the Defra LiDAR Composite DSM, 2020, resolution 1m.

4.2 False origin

3D modelling programs, unlike CAD/BIM programs, have inherent inaccuracies the further an object is away from the origin. Cityscape decide on and record a local, 'false origin' that is used to move the model closer to the origin. This alleviates the inaccuracies. The 3D model of the proposed development, consented scheme models, and survey data are all moved uniformly to this new false origin. When performing positioning checks (see Section 5.2) the offset between false origin and OS are added back to the coordinates.



11: 1m resolution LiDAR GeoTIFF

12: Resulting 3D TIN mesh

9 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp.11, Table2, pp 19-20.

10 'TGN 06/19 Visual Representation of development proposals.' Available at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/09/LI_TGN-06-19_Visual_Representation.pdf (Accessed: March 2022).pp 56-57

11 'Guidance – Visual representation of wind farms – Feb 2017' Available at: https://www.nature.scot/sites/default/files/2019-09/Guidance%20-%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf (Accessed at March 2022). pp 8-9

5.0 Model positioning

Applies to Type 3 and Type 4 visualisation.

5.1 Model source

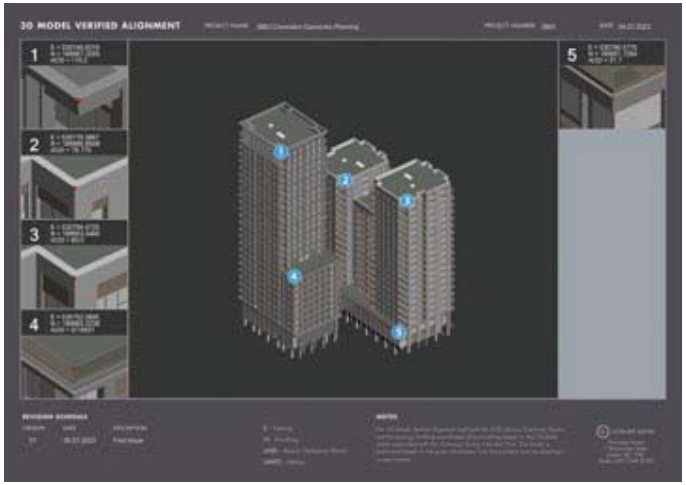
A wireframe 3D model of the proposed scheme if not provided is created by Cityscape from plans and elevations provided by the architects and from survey information of the ground levels on site and various other points on and around the site, such as the edge of adjacent roads and pavements etc. provided by the surveyor.

5.2 Proposed model position check

The architect supplies a 3D model in OS coordinates that can be used 'as is' for position checks as described below (utilising the false origin as described in Section 3.3). Alternatively, a non OS located model can be provided together with a floor plan that is positioned in an OS map. The model can then be positioned by way of setting it on the floor plan. Heights are either preserved from the original model if supplied in AOD, or taken from supplied elevations.

Once the model is positioned, confirmation of height and Easting/ Northing Coordinates is requested from the architect.

At least two clear reference points are agreed and used to confirm the placement of the model.



13: Proposed model position check

6.0 Camera matching – Type 4 visualisations

6.1 Cityscape's database

Cityscape has built up a comprehensive database of survey information on buildings and locations in central London; the database contains both GNSS survey information and information regarding the dimensions and elevations of buildings gathered from architects and other sources.

The outlines of buildings are created by connecting the surveyed points or from the information obtained from architects' drawings of particular buildings. By way of example of the high level of detail and accuracy, approximately 300 points have been GNSS surveyed on the dome of St. Paul's.

The database 'view' (as shown in Figure 14) is 'verified' as each building is positioned using coordinates acquired from GNSS surveys. In many instances, the various coordinates of a particular building featured in one of the background plates are already held by Cityscape as part of their database of London. In such cases the survey information of buildings and locations provided by the surveyor (see Section 3.2 above) is used to cross-check and confirm the accuracy of these buildings. Where such information is not held by Cityscape, it is, where appropriate, used to add detail to Cityscape's database.

The survey information provided by the surveyor is in all cases used in the verification process of camera matching.

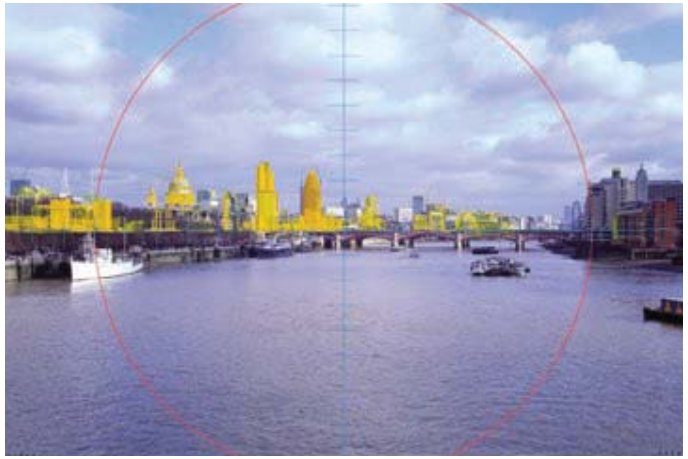
14: Selected GPS located models (yellow) from Cityscape's database, situated on Cityscape's London digital terrain model

6.2 Camera matching process

The following information is required for the camera matching process:

- Specific details of the camera and lens used to take the photograph and therefore the field of view (see Section 1);
- The adjusted or corrected digital image i.e. the 'background plate' (see Section 2);
- The GNSS surveyed viewpoint coordinates (see Section 3.2);
- The GNSS surveyed coordinates of points within the the background plate (see Section 3.2);
- Selected models from Cityscape's database (see Section 6.1);
- The GNSS surveyed coordinates of the site of the proposed scheme (see Section 3.2);

The data is combined in a 3D software package and is then used to situate Cityscape's virtual camera such that the 3D model aligns exactly over the background plate (as shown in Figures 15, 16 and 17) (i.e. a 'virtual viewer' within the 3D model would therefore be standing exactly on the same viewpoint from which the original photograph was taken (Figure 3). This is the camera matching process.



15: The background plate matched in the 3D GPS located models

16: Background plate matched to the 3D GPS located models

17: The camera matched background plate with an example of a proposed scheme included in red

7.0 Camera matching – Type 3 visualisations

7.1 Cityscape's context models

Cityscape have purchased available 3D city models of large parts of London and other parts of the UK that are modelled to within 25cm accuracy. Where available this data is used to create camera matches for Type 3 visualisations, or additional data is purchased.

In addition, or where 3D city models are not available, DSM data is used for camera matching (see Section 4).

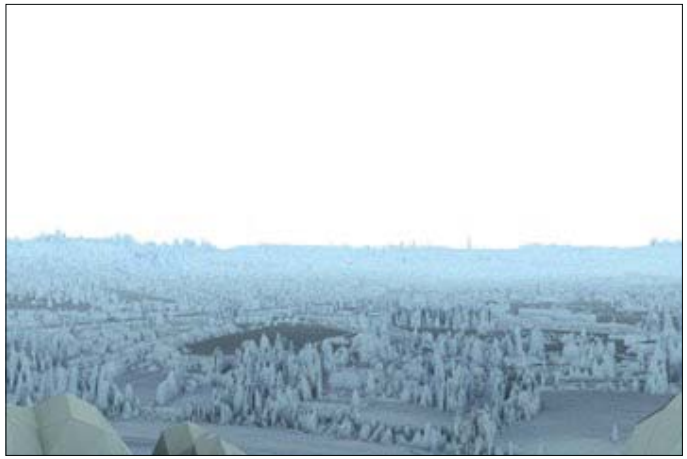
7.2 Camera matching process

The following information is required for the camera matching process:

- Specific details of the camera and lens used to take the photograph and therefore the field of view (see Section 1);
- The adjusted or corrected digital image i.e. the 'background plate' (see Section 2);
- 3D city model and/or DSM context model (see Section 4);
- Selected models from Cityscape's database (see Section 6.1);
- A 3D model of the proposed scheme (see Section 5)

The data is combined in a 3D software package and is then used to situate Cityscape's virtual camera such that the 3D model/DSM aligns exactly over the background plate (as shown in Figure 20) (i.e. a 'virtual viewer' within the 3D model would therefore be standing very close to the same viewpoint from which the original photograph was taken (Figure 3). This is the camera matching process.

18: Background plate: digital photograph, size and bank corrected as described in Section 2



19: Render: DSM model render, camera matched

20: Camera matching: the background plate matched in DSM TIN mesh

8.0 Rendering

8.1 Wireline image (AVR 0/1)

The proposed developments are shown using a constant thickness wireline. The line is generated from a computer rendering of the 3D model and follows an 'inside stroke' principle.

Rendering is a technical term referring to the process of creating a two dimensional output image from the 3D model. The 'inside stroke' principle is followed so that the outer edge of the line touches the outline of the render from the inside, fairly representing the maximum visibility.

The camera matching process is repeated for each view and a wireline image of the proposal from each viewpoint is then produced. The wireline image enables a quantitative analysis of the impact of the proposed scheme on views.

8.2 Rendered image (AVR 3)

In order to assist a more qualitative assessment of the proposals, the output image needs to be a photo-realistic reflection of what the proposed scheme would look like once constructed. This is called an AVR3.

8.3 Texturing

The process of transforming the wireframe 3D scheme model into one that can be used to create a photorealistic image is called texturing[12].

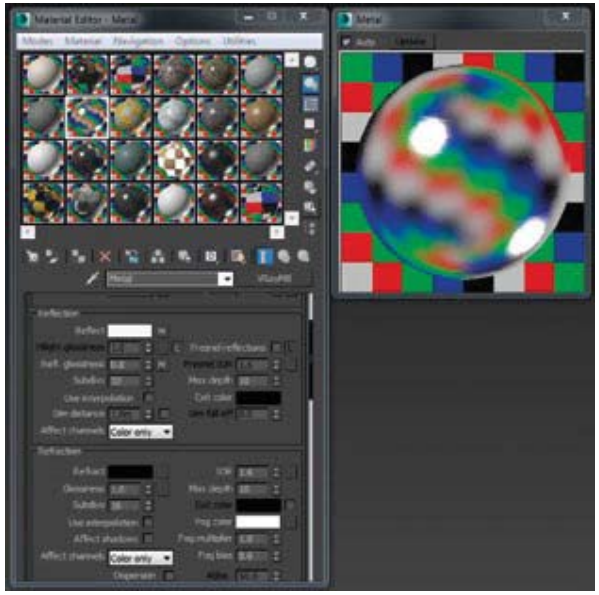
Prior to rendering, Cityscape requires details from the architect regarding the proposed materials (e.g. type of glass, steel, aluminium etc.) to be utilised.

Cityscape also use high resolution photographic imagery of real world material samples, supplied by the client or the manufacturer, to create accurate photorealistic textures for use in all our images. This information is used to produce the appearance and qualities in the image that most closely relates to the real materials to be used (as shown in Figure 21).

8.4 Lighting and sun direction

The next stage is to light the 3D model to match the photographic environment. The date, time of the photograph and the latitude and longitude of the city are input (see Figure 22) into the unbiased physically accurate render engine. Cityscape selects a 'sky' (e.g. clear blue, grey, overcast, varying cloud density, varying weather conditions) from the hundreds of 'skies' held within its database to resemble as closely as possible the sky in the background plate.

The 3D model of the proposed scheme is placed within the selected sky (see Figure 23) and using the material properties also entered, the computer calculates the effects of the sky conditions (including the sun) on the appearance of the proposed scheme.



21: Screenshot of some materials in the 3D rendering package.

22: Screenshot of environment information (time, date and year) entered to locate the sun correctly (see Section 7.

23: Example of a proposed scheme highlighted in red within the selected sky and rendered onto the background plate

12 Texturing is often referred to as part of the rendering process, however, in the industry, it is a process that occurs prior to the rendering process.

9.0 Post production

9.1 Post production

Finally, the rendered image of the scheme model is inserted and positioned against the camera matched background plate.

Once in position, the rendered images are edited using Adobe Photoshop®. Masks are created in Photoshop where the line of sight to the rendered image of the proposed scheme is interrupted by foreground buildings (as shown in Figure 24).

The result is a verified image or view of the proposed scheme (as shown in Figure 25).

24: Process red area highlights the Photoshop mask that hides the unseen portion of the render

25: A photo-realistic verified image

Cityscape Digital

Printworks House
7 Bermondsey Street
London SE1 2DD

020 7566 8550

References

[i] HMSO, 2011. The Town and Country Planning (Environmental Impact Assessment) Regulations
[ii] HMSO, 2015. The Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2015
[iii] HMSO, 2017. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017
[iv] HMSO, 2018. The Town and Country Planning (Environmental Impact Assessment) (Amendment) Regulations 2018